Engineers
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Scientists

March 28, 1985

W65246.C0

Mr. Gregg Kulma
Region Site Project Officer
U.S. Environmental Protection Agency Region V
230 South Dearborn Street
Chicago, Illinois 60604

Dear Gregg:

We are pleased to submit two copies of the final Remedial Investigation Report for the Fields Brook Remedial Investigation/ Feasibility Study, Work Assignment No. 19.5L46.0.

Copies of this letter and the Remedial Investigation Report have been distributed to all listed below.

Respectfully submitted,

Randy

Randolph M. Videkovich
Site Project Manager

Attachments

cc: The Honorable Dennis Eckart, Congressman, Ohio 11th District
Fred Larson, U.S. EPA, Region V (without enclosure)
Randall Kaltreider, REM-DPO, U.S. EPA (2 copies)
Kerry Street, U.S. EPA, Region V
Alan Wojtas, U.S. EPA, Region V
Jim Hooper, U.S. EPA, Region V
Larry Fink, U.S. EPA, Region V
Larry Kyte, U.S. EPA, Region V
Dave Barna, U.S. EPA, EDO
Ed Seger, U.S. Army COE, Buffalo
Steve Tuckerman, Ohio EPA, NED
Gary Gifford, Ohio EPA, NED (3 copies)
Roger Hannahs, Ohio EPA, CO (4 copies)
Robert Indian, Ohio DOH
Wanda Large, Ohio DOT
Ashtabula County Commissioners (3 copies)

CH2M HILL, INC Milwaukee Office 310 West Wisconsin Avenue, Suite 700 P.O. Box 2090, Milwaukee, Wisconsin 53201 414.272.2426

Mike Wheeler, Ashtabula County Disaster Services
Raymond Saportito, Ashtabula County Health Dept.
Robert Bollman, Ashtabula City Manager
Ashtabula Public Library (2 copies)
Pat Helmeci, Citizens for Clean Water (3 copies)
Jim Butt, AZPM-REM, MAR/WDC
Vicki Kohonoski, PROJ ASST, MAR/WDC
Mike Jury, RPTL, QA RVW, GLO
Mike Harris, RPTL, GLO
Mike Thompson, RPTL, KC
Jim Schwing, RPTL, DEN
Mike Kemp, RPTL, SFO
Bob Davis, RPTL, DEN
Bob Schilling, RPTL, SEA
Phil Smith, QA RVW, GLO
Nancy Schultz, QA RVW, GLO
John Fleissner, QA RVW, GLO

HAZARDOUS
SITE CONTROL
DIVISION

Remedial Planning/ Field Investigation Team (REM/FIT)

ZONE II

CONTRACT NO.
68-01-6692

CH2M HILL
Ecology &
Environment

FINAL

REMEDIAL INVESTIGATION REPORT

FIELDS BROOK SITE
ASHTABULA, OHIO

WA 19.5L46.0
W65246.C0

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acidic, has a high seasonal water table (0_4 to 1/2 foot), and relatively low hydraulic conductivity (10^{-4} to 10^{-5} cm/sec). The Swanton fine sandy loam is similar to the Conneaut, except that the upper 18 to 40 inches of soil is sandy and has a high hydraulic conductivity. Manmade land is a highly variable soil that results from cut and/or fill activities.

Other soil units occur with limited extent. The Hornel silt loam occurs where the shale bedrock protrudes above the glacial cover, and the Allis silt loam occurs where the bedrock is approximately 2 to 3 feet below the soil surface.

BASIN DESCRIPTION

ASHTABULA RIVER

Fields Brook drains into the Ashtabula River about 8,000 feet upstream of the river's confluence with Lake Erie. The Ashtabula River is formed in Monroe Township, Ohio, by the confluence of the West Branch, which begins in eastern Ashtabula County and flows north, and the East Branch, which begins in extreme western Pennsylvania and flows northwest. The river then flows in a northwesterly direction and empties into Lake Erie at Ashtabula. Including the West Branch, the Ashtabula River is approximately 40 miles long with a total drainage area of 137 square miles. Approximately 80 percent of the Ashtabula River basin is used for farming and woodlands. Most of the industrial development of the Ashtabula River watershed is in the Fields Brook drainage basin and in the area surrounding the City of Ashtabula.

FIELDS BROOK

The Fields Brook watershed has an overall length of about 5-1/2 miles with a main channel length of 3.5 miles. The channel begins south of U.S. Highway 20 about 1/2-mile west of Blake Road and flows in a generally westerly direction towards the Ashtabula River. Five tributary streams are associated with Fields Brook. Stream stationing and identified industrial outfall locations along Fields Brook and its tributaries are shown in Figure 2-3.

From just upstream of Cook Road (Station 19400) to Middle Road (Station 16700), the Brook has been channelized with a typical section being about 3 feet wide at the bottom and about 4 feet at the top. In this reach, at Station 17900, the SCM industrial discharge enters the stream. Downstream of Middle Road, the stream flows into a 500-foot culvert under the Union Carbide/Linde division plant's parking lot.

West of the Union Carbide culvert, the streambed has been channelized and is about 4 feet wide and 2 feet deep. The

Elkem Metals (known as ELKEM, and L-TEC Welding and Cutting Systems); the area south of Cleveland Electric Illuminating Company's coal pile; and several closed landfills.

The remainder of this report along with the figures refer to the outfalls as they were known in 1983.

PHYSIOGRAPHY

Fields Brook drains a portion of the Eastern Lake Section of the Central Lowland Province, commonly referred to as the Lake Plain. This belt, about 3 to 5-1/2 miles wide, consists of the present day Lake Erie bluffs, glacial lake beach ridges south of the Lake Erie bluffs, the glacial Lake Warren Terrace (basically between STH 531 and U.S. Highway 20), the Lake Warren beach ridges (U.S. Highway 20 generally follows this ridge) and, to the south, the Ashtabula Moraine (part of the escarpment separating the Central Lowland Province from the Appalachian Plateaus Province to the south; STH 84 generally follows the base of this escarpment).

GEOLOGY

The bedrock underlying the Fields Brook watershed is siliceous Devonian age shale of the Chagrin member of the Ohio Formation. The Ohio Formation is several hundred feet thick and consists of interbedded layers of shales and sandstone. At other locations within Ashtabula County, the interface between the shale and the overburden has been described as varying between a soft, decomposed weathered shale to solid unweathered shale. The Chagrin member has been reported by U.S. EPA (Toxic Summary Report) to have a lower hydraulic conductivity compared to overlying materials and to be anisotopic, limiting the vertical movement of groundwater. Potential groundwater contamination is believed by U.S. EPA (Toxic Summary Report) to be confined to the unconsolidated deposits above the shale.

The overburden materials, described as glacial tills, are reported to average about 25 feet in thickness but may vary from 0 to 60 feet thick in the Fields Brook watershed. These tills are the result of the Wisconsinan glacial stage and vary with location. Silts and clays (primary illite and chlorite) are predominant.

SOIL

According to the Soil Conservation Service Soil Survey of Ashtabula County, three soil units are present in the basin. These are the Conneaut silt loam, the Swanton fine sandy loam, and manmade land. The Conneaut silt loam is a nearly level, poorly drained soil formed in lake deposits. It is

probable contaminants associated with each industry. Locations of the outfalls of these industries are included in Figure 2-3.

ACME SCRAP METAL

Acme Scrap Metal reclaims metal products. A storm drain from the plantsite, whose outfall is on the south bank of the upstream side of State Road, has had frequent oily discharges. Measured PCB levels in an oil layer at the outfall and nearby soil have been in excess of 350 ug/L and 114 ug/kg, respectively. The facility has been the subject of an EPA PCB compliance report (March 30, 1982). An oil retention lagoon was installed in 1982 to capture oils from site drainage. The facility has no NPDES permit for the storm drain outfall.

DETREX CHEMICAL INDUSTRIES, INC.

Detrex Chemical Industries, Inc., manufactures muriatic acid through contact of water with chlorine gas. The chlorine gas is either generated onsite or purchased as a byproduct from nearby industries. In the past, Detrex also manufactured N-methylpyrole through a catalytic reaction of furan and monomethylamine. The facility previously manufactured chlorinated solvents, and the wastes from the manufacture of these solvents were kept in onsite lagoons.

The lagoons were emptied and refilled with clay in 1977. An 1980 RCRA reconnaissance inspection found numerous unidentified drums onsite and an open waste mound. Hexachlorobutane was found to be the primary constituent of the waste mound. The drums were identified and storage/disposal methods improved. The site was issued a state hazardous waste permit (02-04-0415) in December 1981, and has received Interim Status under RCRA.

DIAMOND SHAMROCK CORPORATION

The Diamond Shamrock Corporation semiworks plant manufactures small, semicommercial quantities of test chemicals. The chemicals produced have varied throughout the plant's history and have included mercaptans, polysulfides, hexachlorobutadiene, methylester monochloracetate, phenol derivatives, slimicides, and metal coatings. In 1970, wastewater from the plant and site drainage was being stabilized in two limestone rock ponds. In 1974 and succeeding years, treatment processes were upgraded to the present system of pH adjustment, multimedia filtration, and settling.

Onsite hazardous materials include both raw materials and products. An 1980 "Potential Hazardous Waste Site Inspection" conducted by U.S. EPA cited the potential of spilled materials

Table 2-3 (page 1 of 3)

HAZARDOUS SUBSTANCES

MAXIMUM CONCENTRATIONS REPORTED (Pre 1982)[a]

	Industrial Effluent										Fields Brook		Ashtabula River	
	Acme	Detrix	Diamond Shamrock	General Tire	G & W	IMC	Olin	RMI	SCM	Union Carbide	Fish	Sediment	Fish	Sediment
Pesticides														
Chlordane											26		20	
DDE											66		0.79	
DDT													0.92	
Dieldrin						0.18								11,600
Heptachlor		<1											77	
Metals & Inorganics														
Antimony			<.2			30								38,000
Arsenic (total trivalent)			<.5		26							19		33,000
Barium		39.5	31		180	38	3,400							1,160,000
Beryllium			<.5											1,300
Cadmium (total)		2.2	<.5					5				39,000		10,000
Chromium (total hexavalent)					<10									
Chromium (total)			109	9	130		49,000	30	23	273		130,000		2,200,000
Copper (total)		11.5	1,206	23			16	240	9	7,000		140,000		82,000
Cyanides (free cyanide)			72		20					740				1,100
Lead (total)			<80		18	40		18				130,000		79,000
Mercury (total)		0.1	<0.1	1.0	<2	9.6	0.1	1.7	0.3	0.2	0.36	45	0.36	2,700
Nickel (total)		39.4	8			25								140,000
Selenium (total inorganic selenite)														8,300
Titanium			45.4	<.66	8	1,900		8		12	389			13,000
U-238								1,830pC1/1				148pC1/1		
Zinc			34	171	60	24	190,000	600	152			3,600		830,000
PCB's and Related Compounds														
PCB's (general)	358		13		62						3.23	3,660	7,200	120,000
Halogenated Aliphatics														
Methane, Chloro-(methyl chloride)		318			20			30		20		53		605
Methane, Dichloro-(methylene chloride)			12,000									115		
Methane, Chlorodibromo-												237		
Methane, Tribromo-(bromoform)							26.3							
Methane, Trichloro-(Chloroform)			80	74	10		4.6	10		70		1,290		
Methane, Tetrachloro- (carbon tetrachloride)			2,000	5.7			3.0					311		
Methane, Trichlorofluoro- (trichlorofluoranthane)				4										
Ethane, Chloro-												164		
Ethane, 1,1-Dichloro-						30						45		
Ethane, 1,2-Dichloro-		1		50								10.8		
Ethane, 1,1,1-Trichloro-		7	2,400									413		
Ethane, 1,1,2-Trichloro-		82	<10	5								3,580		
Ethane, 1,1,1,2-Tetrachloro-											18		2.6	
Ethane, 1,1,2,2-Tetrachloro-		425	<10	1.0			4.0				49	368,000		73.5
Ethane, Hexachloro-		trace					32,000					778,000		3.0
Ethane, Pentachloro-				1,000										
Ethene, Chloro-(vinyl chloride)				3.1		10						120		
Ethene, 1,1-Dichloro-												5,803		
Ethene, 1,2-Dichloro-		333												
Ethene, Trans-1,2-Dichloro-			<10		4		3.7					6,290		
Ethene, Trichloro-		414	13	290			trace					134,000		260
Ethene, Tetrachloro-		2,156		3.4	170		22,000					2,118		3,700
Propane, 1,2-Dichloro-		1.7	20		10									
Butadiene, Hexachloro-			11								3,250	1,127	445	72,000
Butadiene, Pentachloro-												2,649		1,100
Butadiene, Tetrachloro-												2,849		756

[a]Concentrations in ug/L, except for fish and sediment which are in ug/kg.

(3100 to 250,000 ug/kg) and trichloroethene (9,100 to 470,000 ug/kg) were found. Additionally, 1,2-trans-dichloroethene (34,000 ug/kg), chlorobenzene (6,200 to 49,000) and 2-butanone (2,900 to 3,400 ug/kg) were found only at location 211. Of the above-mentioned volatiles, all of the chloro-ethanes/ethenes were found in the sediment of the Detrex tributary. Concentrations, generally, decreased from location 211 downstream to location 207.

Polychlorinated Biphenyl Compounds. PCB's were found in the sediment throughout this reach downstream of sampling location 210 and the G&W $TiCL_4$ outfall. The highest concentrations were at sampling locations 17, on the upstream side of State Road, (520,000 ug/kg) and 208B, downstream of State Road, (350,000 to 600,000 ug/kg).

Base/Neutral Compounds. Chlorinated benzene compounds, hexachlorobutadiene, and bis(2-ethylhexyl)phthalate were found in the sediment sampled throughout the reach. Where multi-depth sampling occurred, the chlorinated benzene compounds and the hexachlorobutadiene concentrations were generally the highest in the 6- to 12-inch layer with concentrations ranging up to 321,000 and 206,000 ug/kg, respectively. Phthalate concentrations were reported as high as 30,000 ug/kg and generally decreased with depth.

PNA's were found at State Road and downstream to STH 11 (concentrations up to 2,500 ug/kg) except at sampling location 206. Benzo(a)pyrene (4,500 ug/kg), chrysene (5,700 to 8,100 ug/kg), benzo(ghi)perylene (3,400 to 3,900 ug/kg), phenanthrene (4,200 to 9,200 ug/kg) and pyrene (3,800 to 5,600 ug/kg) were all found in higher concentrations at this location relative to the rest of this reach.

Fields Brook - Ashtabula River to STH 11

Volatile Compounds. VOC's were not found in the sediment sampled in this reach above trace levels (concentrations at or just above detection limits).

Polychlorinated Biphenyl Compounds. PCB's were identified (300 to 11,400 ug/kg) in samples obtained throughout the reach.

Base/Neutral Compounds. Chlorinated benzene compounds were intermittently found in the sediment ranging from 3,900 to 5,900 mg/kg. Hexachlorobutadiene was found in most samples from this reach, as was bis(2-ethylhexyl)phthalate. In the sample from location 202, taken from a deep sediment bed on the inside of a channel bend, several PNA's were detected. This was the only location in this reach with concentrations of PNA's above trace levels.